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42,391/64

COMMONWEALTH OF AUSTRALIA

PATENT SPECIFICATION

Class

Int. Cl.

Application Number
Lodged

42,391/64.
23rd March, 1964.

04.2; 06.6.

H02f.

Complete Specification
Entitled

OUTLET DEVICE FOR AERIAL ELECTRICAL CABLE.

Lodged
Accepted
Published

23rd March, 1964.
Lapsed Before Accepted.
23rd September, 1965.

Convention Priority

30th July, 1963, United States of America; 298627.

Applicant

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Related Art:

130,640(21,001/45)
241,057(50,492/59)
11,124/33

04.2; 06.6.
06.6; 04.2.
04.2; 06.6.

The following statement is a full description of this invention, including the best method of performing it known to us:

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The present invention relates to an outlet for an aerial cable and in particular one which can be easily and quickly attached anywhere upon an aerial electrical cable without cutting or stripping the cable.

This inventor's copending application entitled "Electrification System," Serial No. 256,478 filed February 5, 1963 and assigned to Insul-8 Corp., assignee of the present invention, which in turn is a continuation of the now abandoned application Serial No. 803,878 filed April 3, 1959, discloses and claims an electrical distribution system for economically delivering electrical branch circuit power to large open areas and providing the sole support for one or more of the electrically operated devices to which it supplies electrical power. This system includes an aerial cable having electrical conductors and a supporting and grounding messenger cable retained in parallel spaced relationship by a covering of suitable insulation material. The system is installed by attaching respective ends of the messenger cable to widely separated structural support members. Each installed length is a complete branch circuit to which receptacle and lamp holder outlet devices can be attached at any point. A recent change in the National Electrical Code establishes a category for this type of system as Article 342-7 (b) of the 1962 Code.

It is an object of the present invention to provide an improved outlet device for aerial cable systems which can be installed and shifted anywhere along the aerial cable without cutting or stripping the cable.

It is another object of the present invention to provide an outlet device for aerial cable which is very simply attached to the cable.

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3 Another object of the present invention is to provide an electrical outlet device for aerial cable which substantially inhibits the ingress of moisture between the device and the aerial cable.

5 Other and further objects, features and advantages of the invention will become apparent as the description proceeds.

10 Briefly, in accordance with a preferred form of the present invention, an outlet device for aerial cable electrification systems includes a base having a cylindrical shell formed in one end thereof. A resilient sealing member forms a channel through oppositely disposed aligned slots in the cylindrical shell portion of the base. A cap member having an elongated boss is disposed in this channel to form an electric cable receiving aperture bounded by the channel walls and the bottom of the boss. An electric outlet such as a receptacle or lamp base is fastened to the end of the base member opposite the cylindrical shell. Electrically conducted prongs are mounted within the cylindrical shell of the base and extend through the resilient sealing member into the electric cable receiving aperture. Electrically conductive members extend through respective apertures of the base and electrically connect the electric outlet to respective prongs.

20 25 In use, the aerial cable is placed within the channel formed by the resilient sealing member with the pointed ends of the prongs in contact with the outer surface of the cable. The cap member is then assembled with its boss also disposed in the channel. When this cap is secured so as to abut the top surface of the resilient sealing member, the aerial cable is drawn down upon the prongs which pierce its insulation covering and

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make electrical contact with the conductors disposed therein. Phase polarization between the aerial cable and the outlet is maintained by matching an off center ridge of the cable with a matching groove in the resilient sealing member.

Electric outlet devices constructed in the manner described can be removed by simply removing the cap member and pulling the base from the aerial cable. The holes left in the insulation are quite small so that no repair to the cable such as covering the holes is required. Thus, any or all receptacles and lighting fixtures can be removed or shifted upon a given aerial cable quickly and easily according to changing system requirements.

A more thorough understanding of the invention may be obtained by study of the following detailed description taken in connection with the accompanying drawings in which:

Fig. 1 is an exploded perspective view of an electric outlet receptacle for aerial electrical cable constructed in accordance with the invention.

Fig. 2 is a plan view of the base prior to insertion of the potting material;

Fig. 3 is a bottom view of the sealing and channel forming member;

Fig. 4 is a plan view of the sealing and channel forming member;

Fig. 5 is an elevation view of the receptacle installed upon the aerial electrical cable;

Fig. 6 is an elevation view of the receptacle during attachment to the aerial electrical cable;

Fig. 7 is a cross-sectional view taken substantially along line 7-7 of Fig. 5 so as to illustrate three sets of contact prongs disposed in spaced parallel planes; and

Fig. 8 is a cross-sectional view of an electric lamp holder for aerial electrical cable constructed in accordance with the invention.

Referring now to Figs. 1-7, there is shown an electric outlet receptacle 10 having a base 11, a receptacle 12 and a cap 13. These members are shown as being generally cylindrical although other cross-sectional configurations may be utilized, e.g. square or rectangular configurations. These members are conveniently formed by molding a dielectric plastic material.

Outlet receptacle 10 is adapted to be installed at any given point upon an aerial electrical cable 15, a preferred embodiment of which is shown in Fig. 1. As shown, this cable comprises an elongated cable-like body 16 formed of electrically insulating material, this body at each cross-section throughout its length having a central part of maximum thickness and oppositely extending side parts. Each of these side parts is defined by upper and lower walls which converge outwardly from the central part. A wire messenger cable 17 is embedded in the central port and elongated parallel conductors 18, 19 are respectively located in the side ports. An off-center ridge 20 extending the length of the cable maintains phase polarization with the outlet devices, as described below.

The conductors 18, 19 serve as the branch circuit conductors; messenger cable 17 supports the cable and one or more of the electrical devices to which it supplies power and also may be used for the grounding of equipment. Because of its latter function, the outlet devices of this invention are so constructed to maintain a very high dielectric resistance between the ground and branch circuit paths.

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A cylindrical shell 21 is formed at one end of the base 11 and includes oppositely disposed aligned slots 22, 23. Electrically conductive prong sets 25, 26 and 27 are affixed to the bottom of the cylindrical shell 21 with the prongs extending vertically toward its open end. Each prong set may comprise one or more prongs in alignment with respective ones of the conductors of the aerial cable, dual prongs being employed in the unit shown to insure adequate current carrying capacity and positive electrical contact with the aerial electrical cable. These prong sets may be molded to the shell when manufactured, or alternatively attached to an electrically conductive base which in turn is attached to a conductive shank extending through the base 11 to the receptacle 12. In the preferred embodiment shown, respective bases 30, 31 and 32 respectively support prong sets 25, 26 and 27. As described more in detail below, prong sets 25, 27 are adapted to engage the branch circuit conductors and prong set 26 is adapted to engage the supporting and grounding messenger cable. Accordingly, prong sets 25, 27 extend further upwardly into the shell 21 to insure electrical contact with the conductors when the unit is assembled upon the aerial cable 15 (Fig. 7). Also, an enhanced dielectric path is provided between bases 30, 32 and base 31 by mounting the former bases in a common plane at the bottom of shell 21 and mounting the latter base upon an outwardly extending support 35 (Fig. 7) so that base 31 lies in a different plane than the bases 30, 32. For electrical insulation and moisture sealing purposes, a dielectric potting compound 36 is preferably poured into the cylindrical shell to cover bases 30, 32 and all of the space between these bases and base 31 (Figs. 1 and 7).

A channel 40 disposed in the aligned slots 22, 23 is formed by member 41. This member is preferably formed of a resilient material such as neoprene rubber and provides a sealing member for inhibiting ingress of moisture between the aerial cable 15 and the outlet device 10. This moisture seal is further enhanced by lateral ridges 42, 43 at respective ends of the channel 40 which engage the bottom of the aerial cable 15 when it is positioned through the electric cable receiving aperture as described below. An additional moisture seal around each prong of ground prong set 26 is provided by ridges 45, 46 which each define a truncated hexagon. These ridges in combination with a portion of the phaseing ridge 20 of the aerial cable 15 provide a ridge which entirely surrounds each prong of set 26. By way of specific example only, for an electrical cable whose maximum exterior dimensions are .812 x .375 inches, ridges 42, 43, 45 and 46 are raised on the order of .031 inches above the surface of the resilient sealing member 41.

An off-center groove 44 is located in the bottom of channel 40. This groove is similar in dimensions and cross-sectional configuration to the ridge 20 of the electrical aerial cable 15 and establishes phase polarization between the outlet device 10 and the cable 15. Thus, respective prong sets 25 and prong set 27 are automatically connected to respective conductors 18, 19 by matching groove 44 and ridge 20. Prior to initial assembly, the opposite side of the member 41 preferably includes respective partial openings 46 (Figs. 3 and 6) in positions corresponding to the prongs mounted to base 11. As described below, when the outlet device is affixed to

the aerial cable, the prongs pierce entirely through the material remaining between the bottom of an opening 46 and the bottom wall of channel 40.

5. The receptacle portion 12 of the electric outlet receptacle 10 comprises a molded housing 50 having respective recessed openings 51 communicating with attachment plug prong receiving openings 52. The number of such openings may be varied in accordance with the number of electrical leads in the aerial cable. Resilient electrical contacts 10 53 are respectively arranged in the recessed openings 51 in alignment with the plug prong receiving openings 52. These contacts are connected to respective shank members 54 which in turn are connected to respective plug prong bases 30, 31 and 32, as shown in Fig. 7. The housing 50 15 is retained to the base 11 by a threaded bolt 55. These mechanical connections are conveniently obtained by staking the shank members to the prong bases and resilient contacts extending through the center of both members 11, 12. As shown in Fig. 7, hexagonal nut 56 may be inserted in an 20 opening 57 formed in the outwardly extending support 35 of the base 11 prior to assembly of the center prong set 26. A dielectric insulating sheet 58 may be retained between the support 35 and the prong base 31 for obviating possible contact between bolt 55 and ground prong set 26.

25 The cap member 13 comprises a relatively shallow cylindrical member having an elongated boss 60. This boss is adapted to be disposed in channel 40. The bottom surface of this boss in combination with the channel walls define an electric cable receiving aperture 61 (Fig. 6). 30 As shown in this Figure, the bottom wall of channel 40 and the bottom wall of boss 60 are preferably tapered from the ends to a point short of the midsection to conform to

the outer cross-sectional configuration of the aerial electrical cable 15.

As described below, the cap member is used to exert a force upon the aerial cable for making an electrical connection with the prongs extending into the cable receiving aperture. It is therefore advisable to construct the cap member of a material having a sufficiently high tensile strength to eliminate any possible cracking or breaking during assembly of the outlet device to the aerial cable. A specific example of one such material is polyester resin reinforced fiberglass.

The electrical outlet device incorporates a means for fastening the cap 13 to the base 11 and in addition providing sufficient force upon the cable and the prongs to make electrical contact therebetween. In the embodiment shown, the base 11 includes internally threaded shanks 65 molded into respective support structures 66 integral with the base 11 and disposed in the cylindrical shell 21. These shanks may extend slightly beyond the end of base 11 to lie within corresponding openings 67 of the seal and channel forming member 41. Respective threaded bolts 68 extended through openings of the cap 13 and openings 67 of member 41 threadedly engage the shanks 65 so that the cap and base may be drawn together as shown in Fig. 5.

In use, the seal and channel forming member 41 is located in the aligned slots 22, 23 of the cylindrical shell 21, with the respective ends of the prong sets inserted in the partial openings 46. The unit is then applied to the aerial electrical cable so that the phaseing groove 44 corresponds to the phaseing ridge 20. The cap member 13 is then installed and drawn down upon the cap. The prongs then pierce first the seal member 41 and then the cable

insulation 16. Each prong set underlies its associated conductor or cable so that electrical connections are automatically made therebetween when the two assembling screws are tightened. No cutting, stripping or usual assembly operations are thus required.

A modified embodiment is shown in Fig. 8, where a lamp base 70 forms the outlet device. This base comprises a threaded lamp receiving opening 71 having a conductive side wall 72 electrically connected to prong set 73 and a conductive terminal 74 at the bottom of the opening electrically connected to prong set 75. These prong sets lie within an aerial cable receiving aperture 80 in respective parallel planes aligned with the conductors of the aerial electrical cable, in the manner described hereinabove with reference to the receptacle. In a lamp base as shown with an insulated housing, no portion of the housing or related equipment is grounded; accordingly, no prong set in alignment with the messenger cable is necessary.

Although exemplary embodiments of the invention have been disclosed and discussed, it will be understood that other applications of the invention are possible and the embodiments and methods disclosed may be subjected to various changes, modifications and substitutions without necessarily departing from the spirit of the invention.

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The claims defining the invention are as follows:-

1. In a receptacle for aerial electrical cable comprising a messenger cable and electrical conductors retained in parallel spaced relationship by an elongated cable-like body formed of electrically insulating material; a base having a shell formed in one end thereof, said shell being provided with oppositely disposed aligned slots; a resilient sealing member forming a channel disposed in the slots of said shell; a cap member having an elongated boss disposed in said channel; an electric cable receiving aperture being formed by the channel walls and the bottom of said boss; means for applying force between said cap and said base so that said elongated boss engages a surface of said aerial cable causing said prongs to pierce the cable insulation and engage respective ones of said conductors; electrically conductive prongs mounted within the shell of said base with said prongs extending through said resilient sealing member into said electric cable receiving aperture; an electric receptacle mounted to the other end of said base, said receptacle including at least two attachment plug prong receiving openings; resilient electrical contacts arranged in said receptacle respectively in alignment with said attachment plug prong receiving opening; and electrically conductive members extending through said base connecting said resilient contacts to respective ones of said prongs. (30th July, 1963.)

2. The receptacle defined in claim 1 wherein said resilient sealing member includes a lateral ridge at each end of said channel for inhibiting the ingress of moisture between the electrical aerial cable situated in said cable receiving aperture and said sealing member. (30th July, 1963.)

3. The receptacle defined in claim 1 wherein said resilient sealing member includes a ridge at the bottom of said channel and substantially surrounding one of said prongs extending through said resilient sealing member. (30th July, 1963.)

4. The receptacle defined in claim 1 wherein plural ones of said prongs are mounted upon a common electrically conductive base member, said base being retained to the bottom of said shell. (30th July, 1963.)

5. The receptacle defined in claim 4 wherein one of said conductive bases is mounted upon an outwardly extending member within said shell so that said base lies in a different plane than another of said electrically conductive bases, whereby an enhanced dielectric path is provided between said conductive bases. (30th July, 1963.)

6. The receptacle defined in claim 4 wherein a dielectric potting compound is poured into the shell to cover all or a portion of said conductive bases.

(30th July, 1963.)

7. The receptacle defined in claim 1 wherein said resilient sealing member prior to its initial assembly includes a plurality of partial openings aligned with respective ones of said electrically conductive prongs.

(30th July, 1963.)

8. The receptacle defined in claim 1 wherein said cap is constructed of a material having a sufficiently high tensile strength to eliminate cracking or breaking upon application of said force, an example of such material being polyester resin reinforced fiber glass.

(30th July, 1963.)

9. In an outlet for aerial electrical cable comprising a messenger cable and electrical conductors retained in parallel spaced relationship by an elongated cable-like body formed of electrically insulating material; means forming a cable receiving aperture having at least one wall comprising a resilient sealing member, means for electrically contacting said electrical cable comprising electrically conducting prongs extending through said resilient seal into said aperture in alignment with respective ones of said conductors, and means for applying force between said prongs and the aerial electrical cable so that said prongs pierce the cable insulation and engage respective ones of said conductors. (30th July, 1963.)

10. In the outlet for aerial electrical cable defined in claim 9, said resilient sealing wall includes a lateral ridge at each end of the aperture for inhibiting the ingress of moisture between the aerial electrical cable situated in said aperture and said resilient wall. (30th July, 1963.)

11. The outlet for aerial electrical cable defined in claim 9 wherein said sealing wall includes a phase polarization groove adapted to engage a ridge upon the surface of said aerial electrical cable, and a ridge which in combination with a portion of said groove entirely surrounds one of said prongs. (30th July, 1963.)

12. The outlet for aerial electrical cable defined in claim 11 wherein said ridge comprises a truncated hexagonal configuration. (30th July, 1963.)

13. The outlet for aerial electrical cable defined in claim 9 comprising an electrical receptacle

electrically connected to said electrically conducting prongs. (30th July, 1963.)

14. The outlet for aerial electrical cable defined in claim 9 comprising a lamp base electrically connected to said electrically conducting prongs. (30th July, 1963.)

15. The outlet for aerial electrical cable defined in claim 9 wherein said means forming a cable receiving aperture comprises a base member having oppositely disposed aligned slots, a resilient sealing member forming a channel disposed in said slots, and a cap member having an elongated boss disposed in said channel. (30th July, 1963.)

16. In a lamp base for aerial electrical cable comprising a messenger cable and electrical conductors retained in parallel spaced relationship by an elongated cable-like body formed of electrically insulating material; a base having a shell formed in one end thereof, said shell being provided with oppositely disposed aligned slots; a resilient sealing member forming a channel disposed in the slots of said shell; a cap member having an elongated boss disposed in said channel, an electric cable receiving aperture being formed by the channel walls and the bottom of said boss; means for applying force between said cap and said base so that said elongated boss engages a surface of said aerial cable, causing said prongs to pierce the cable insulation and engage respective ones of said conductors; electrically conductive prongs mounted within the shell of said base with said prongs extending through said resilient sealing member into said electric cable receiving aperture; and a lamp base formed at the other

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end of said base including a threaded lamp receiving opening having a conductive side wall and a conductive terminal at the bottom thereof electrically connected to respective ones of said prongs. (30th July, 1963.)

17. In an outlet for aerial electrical cable comprising a support and grounding messenger cable and first and second electrical conductors retained in parallel spaced relationship by an elongated cable-like body formed of electrically insulating material; means forming a cable receiving aperture having at least one wall comprising a resilient sealing member, means for electrically contacting said electrical cable comprising ground and first and second conductor prong sets extending through said resilient seal wall into said aperture in alignment respectively with said messenger cable and said first and second conductors; means for providing an enhanced moisture inhibiting seal around the ground prong set comprising a ridge upon said resilient sealing wall substantially surrounding said ground prong set, and means for applying force between said prongs and the aerial electrical cable so that said prongs pierce the cable insulation and engage respective ones of said conductors. (30th July, 1963.)

Dated this 19th day of March, 1964

INSUL-8 CORP.

By its Patent Attorney

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FIG. 2

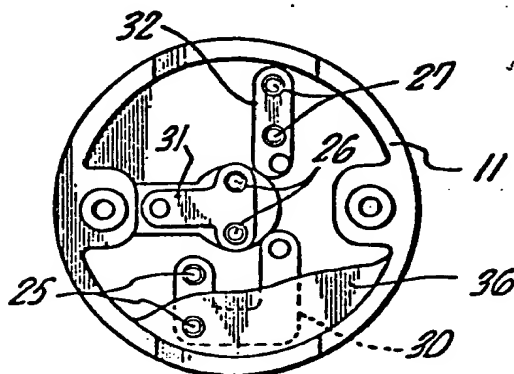


FIG. 3

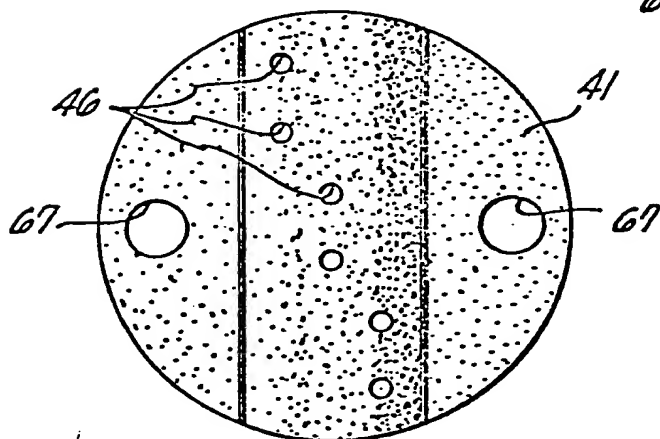


FIG. 4

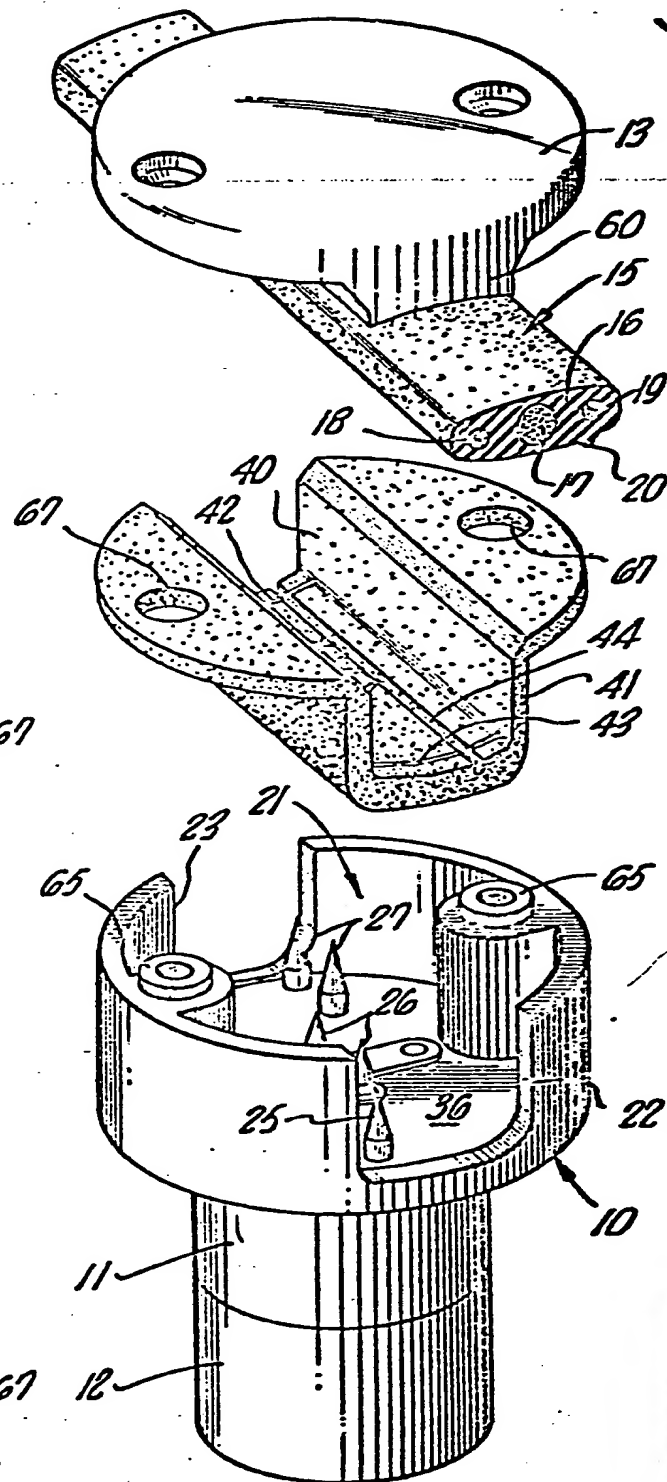
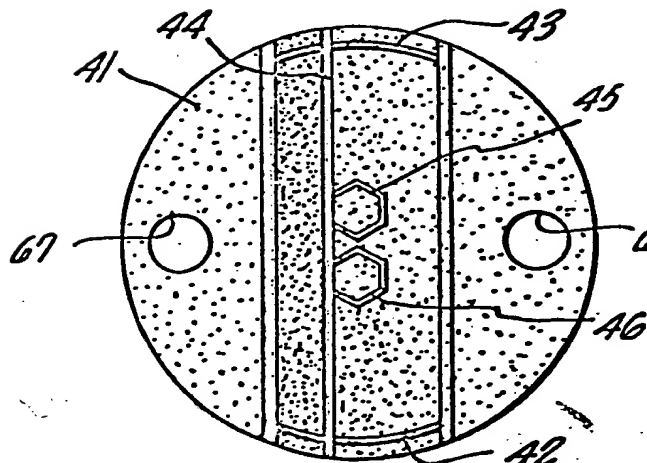


FIG. 1

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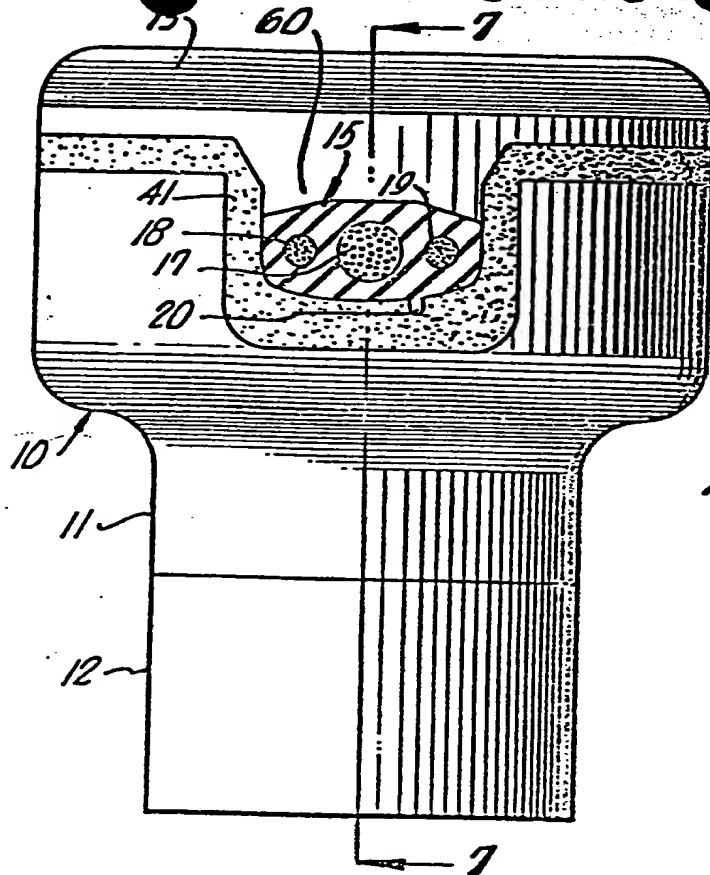


FIG. 5.

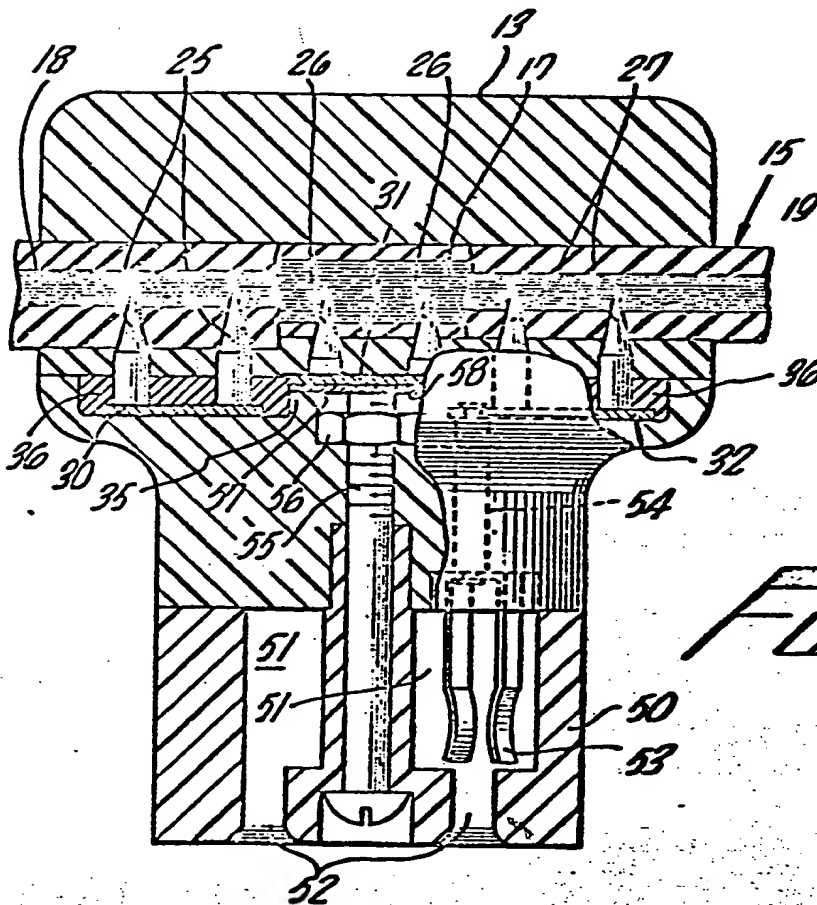


FIG. 7.

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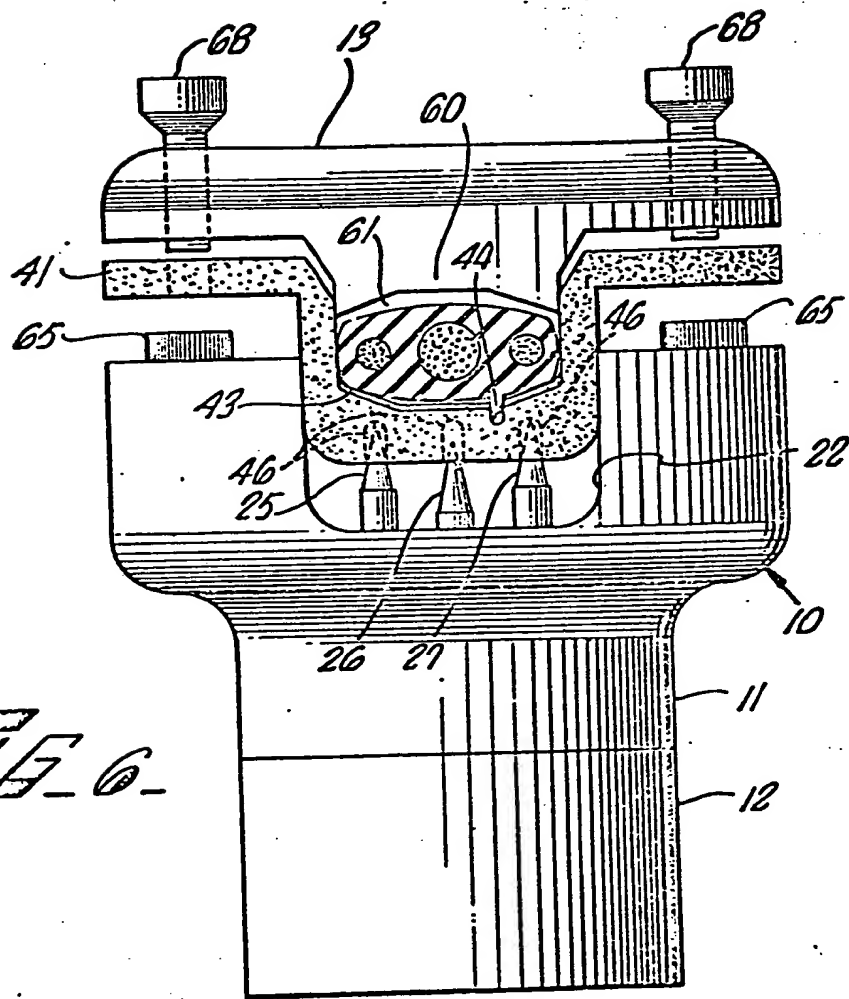


FIG. 6.

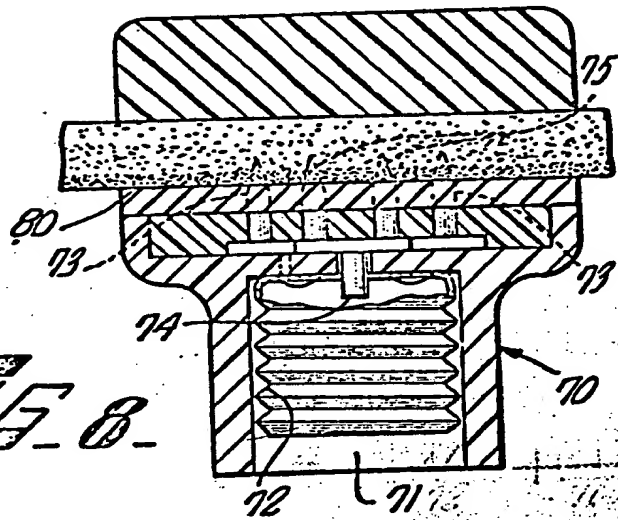


FIG. 8.